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Views of sexual assault following #MeToo: The role of gender and individual differences

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ABSTRACT

One way social movements can achieve change is through impacting public opinion, yet research testing effects of real-world collective action is scarce. In this research, we investigated both short and long-term impact of #MeToo, a global social media movement. We tracked changes in dismissal of sexual assault with self-report surveys among US participants recruited online across four waves of measurement (initial $N \approx 500$): twice before #MeToo movement, at the peak of the #MeToo, and six-months later. We investigated whose attitudes will be most or least affected by the movement by considering individual differences pertaining to gender, gender and feminist identification, and social dominance orientation (SDO). Overall, dismissal of sexual assault reduced following #MeToo among both men and women, and this change persisted six-months later. This effect was moderated by SDO such that low-SDO men and high-SDO women showed the most reduction in dismissal of sexual assault. We did not find a backlash effect as would be suggested by prior work, or by vocal criticism of #MeToo. Potential explanation for SDO's unique influence and implication for social change efforts are discussed.

1. Introduction

Around the world, 35% of women have experienced physical or sexual violence (UN Women). In the US in 2018 alone, 734,630 individuals (2.7% of population) were reported victims of rape or sexual assault (US Bureau of Justice Statistics). In order to raise awareness to the prevalence of sexual harassment and assault, actress Alyssa Milano posted the term “Me Too” as a hashtag on Twitter in October 2017. The action aimed to encourage victims to share their experiences on social media, and it rapidly went viral globally. The #MeToo followed the exposure of US film producer Harvey Weinstein's abuse cases and generated one of the most consequential social movements of our time, it impacted legal and organizational reforms and convictions of sex offenders globally (North, 2019; Stone & Vogelstein, 2019). However, some have raised concerns that #MeToo created a battle of the sexes, which pits women against men, and can instigate a backlash response (Kunst, Bailey, Prendergast, & Gundersen, 2019). A question thus remained about the role of #MeToo in changing the general public's opinion about its cause. The present research aimed to test whether the #MeToo movement indeed succeeded in reducing the extent to which

people tend to downplay sexual assault complaints, both in the short- and long-term. Considering the variability in people's individual characteristics, we also investigated among whom was #MeToo impactful.

Social movements can ultimately achieve change through exerting influence on a broader public (Burstein & Linton, 2002). However, most research on collective action has focused on motives that mobilize people to act, and not on the impact that social movements might have on the broader public (Louis, 2009). The current work joins recent developments in this field where the influence of collective action is at the center of attention (see Teixeira, Spears, & Yzerbyt, 2019 and Thomas & Louis, 2014 for effects of violent vs. non-violent collective action).

Recent work showed that collective action can have an attitude polarization effect (Saguy & Szekeres, 2018). Specifically, researchers investigated the impact of 2017 Women's March on general public's attitudes, and found that exposure to the March was associated with decreased gender system justification tendencies (i.e., the extent one accepts gender hierarchy as legitimate) but only among likely sympathizers of the movement. In this case, among men who weakly identified with their gender group (low gender-identification; i.e., when

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gender is less important to one's self-concept). Meanwhile, exposure increased system justification among strongly identifying men (likely non-sympathizers), indicating a backlash effect. The attitudes of women in this study did not change. Together, this work suggests that collective action might be limited in its potential to change the public's views – it might not change attitudes at all or even lead to backlash. The findings on backlash are in line with reactance theory (see [Rains, 2013](#)) by suggesting that the very movement can make non-sympathizers, those of opposing view, to react even more negatively to the movement's cause. This defensive reaction might be in response to a felt pressure to change one's views ([Rains, 2013](#)). Such potential backlash effect can pose a real challenge for activists. The goal of the present research was to deepen our understanding of these consequences by testing them in a different real-world context, and by providing a long-term assessment of their outcome.

Generally, social media can be a fuel for mobilization and engagement in social matters (e.g., [Valenzuela, 2013](#)). Digital spaces may be especially effective for feminist activism as many women feel safer to share their feminist attitudes and values online compared to in-person interactions ([Mendes, Ringrose, & Keller, 2018](#)). Indeed, even though the #MeToo campaign received negative reactions, that could easily lead some individuals to react in a backlash of attitudes about sexual assault, theoretical work suggests that #MeToo was generally effective in increasing empathy for victims ([Manikonda, Beigi, Liu, & Kambhampati, 2018](#)) and awareness of the prevalence of sexual assault ([Banet-Weiser, 2018](#)). Thus, we overall predict that #MeToo succeeded in decreasing dismissal of sexual assault.

However, to test whether this change is not momentary but long-lasting, we measured attitudes at the peak of the movement, but also six-months later once media and societal attention subsided. Attitudes are resistant to change (e.g., [Prislin, 1996](#)) and people might have felt (socially) pressured and become only externally motivated (knowing what others expect) to demonstrate changed views (e.g., [Klonis, Plant, & Devine, 2005](#)), and eventually returned to their prior beliefs. On the other hand #MeToo might have increased empathy for victims, awareness about the cause, and inserted social influence (even through social media) that not only changed attitudes superficially, but led to long-term internalized and normative change on sexual assault views ([Petty, Brinol, & Priester, 2009](#); [Tankard & Paluck, 2016](#)). Based on this, we predicted that the impact could be long-lasting.

Importantly, we explored how domain-relevant individual characteristics would attenuate or amplify the impact of #MeToo on dismissal of sexual assault. We tested the effect of gender, gender-identification (how central is one's gender to the person's self-concept) and also ideological predictors such as feminist self-identification and social dominance orientation (level of support for group-based hierarchy; see [Pratto, Sidanius, Stallworth, & Malle, 1994](#); SDO hereafter). There is a robust effect of gender in this domain showing that men tend to be more dismissive of sexual harassment and assault than women (e.g., [Rotundo, Nguyen, & Sackett, 2001](#); [Suarez & Gadalla, 2010](#)), and also hold less positive attitudes about #MeToo ([Kunst et al., 2019](#)). However, personal and ideological factors partially account for and complement these gender differences ([Kunst et al., 2019](#); [Russell & Trigg, 2004](#)). For example, tolerance of sexual harassment was found to be associated with higher levels of SDO ([Kelly, Dubbs, & Barlow, 2015](#); [Maass, Cadinu, Guarnieri, & Grasselli, 2003](#); [Rosenthal, Levy, & Earnshaw, 2012](#)), higher gender-identification among men ([Dall'Ara & Maass, 1999](#); [Wade & Brittan-Powell, 2001](#)), and lower levels of feminist-identification ([Ayres, Friedman, & Leaper, 2009](#); [Bhattacharya & Stockdale, 2016](#)).

Thus, we expected that low gender-identifying men, or those with high feminist identification (men and women), or those with low levels of SDO (men and women) would be affected more positively by #MeToo than high-identifying men, or those low on feminism, or those high on SDO, respectively. Previous research on the relationship between women's gender identification and gender attitudes are mixed

(see ([Saguy & Szekeres, 2018](#)), therefore we were exploratory in this regard.

Overall, in the present study we tracked views on sexual assault (assessing opinions on false complaints and whether reporting assault is aimed at hurting men) among a US sample across four waves of measurement: Twice prior to launching #MeToo (after US elections and at the Women's March) and twice after (once at the peak of MeToo and once 6-months later). This last wave was pre-registered: https://osf.io/kmwgr/?view_only=d3130ed728dc46bf93274e96a32cfdc1. We considered the Women's March time point a control comparison for gender protest, enabling us to test whether views of sexual assault change as a function of any gender movement, not uniquely following #MeToo.

2. Method

2.1. Participants and procedure

The study was conducted on mTurk on US participants (81% White/Caucasian, 6% African, 5% Hispanic, 2% Native, 5% Asian American, 1% Other). Respondents were awarded around \$1 at each time. The study allegedly tested public's perceptions of businesses and leadership. Time 1 data was collected in November 2016 (baseline wave; after US elections; $N = 492$). Time 2 data was collected on January 21, 2017 (Women's March; $N = 344$). Time 1 and 2 were designed for another research project, where among other measures, we assessed dismissal of sexual assault enabling us to conduct follow-ups. Participants from Time 1 were invited back for Time 3 on November 16, 2017 (beginning of #MeToo; $N = 241$), who then were invited back six months later for Time 4 follow-up in May 2018 (no relevant event occurred then). A total of 167 participants returned to complete Time 4 survey (54.5% men, 45.5% women, $M_{age} = 37.02$). All participants responded to an attention check question used in Time 3 survey correctly.

2.2. Measures

Participants were asked demographic questions, such as their age, race/ethnicity, and gender (Male/Female/Other).

2.2.1. Gender-identification

We averaged two items into a scale (revised and shortened from [McCoy & Major, 2003](#)): "Being a man/woman is an important part of my self-image" and "Being a man/woman is an important reflection of who I am." [man or woman appeared in these sentences according to participants' indicated gender] on a scale from 1 = strongly disagree to 7 = strongly agree (for women: $r = 0.93$, $p \leq 0.01$; for men: $r = 0.91$, $p \leq 0.01$). We used the scores assessed at Time 1.

2.2.2. Feminist-identification

We assessed participants' identification as a feminist (only added at Time 3) on a continuous scale from 0 (not at all) to 100 (very much) with two items "I identify with feminists." and "Being a feminist is a large part of my identity" ($r = 0.87$, $p \leq 0.01$).

2.2.3. Social dominance orientation

To assess SDO (from [Pratto et al., 2013](#)) participants were asked to indicate dis/agreement with 4 statements ($\alpha = .89$) concerning groups in general (on a scale from 1 = strongly disagree to 7 = strongly agree): "Superior groups should dominate inferior groups", "We should not push for equality between groups", "Group equality should be our ideal" (reversed), "In setting priorities, we must consider all groups" (reversed).

2.2.4. Dismissal of sexual assault

We measured views of sexual assault with two items we wrote: "In my view, the increasing number of sexual assaults reported reflects false complaints of women who go too far with their feminist agenda.",

"More than once, women complain of sexual assault to deliberately harm the man they report." Responses were provided on a scale from 1 (strongly disagree) to 7 (strongly agree) at Times 1 and 2, and on a 6-point scale at Times 3 and 4 (due to a mistake). To retain consistency scores were POMP transformed. These two items were averaged into a sexual assault scale ($0.63 < r's < 0.72$, $p \leq 0.01$), where higher scores indicated higher dismissal.

For additional predictors (e.g., parental status), outcome measures (e.g., benevolent sexism), and #MeToo-related questions (assessed only at Times 3 and 4) see Supplementary Materials.

3. Results

3.1. Analytic strategy

The code used to analyze the data can be found at https://osf.io/kmwgr/?view_only=d3130ed728dc46bf93274e96a32cfdc1. All analyses were conducted using mixed-level modeling (using the *lme4* package in R), first examining changes over time by gender, and then testing each moderator. Since there was no linear progression of a variable over time, and we were primarily interested in impact of #MeToo, which occurred at time 3, we treated time as a categorical within-subjects variable. The following contrasts were created: D1 (time 1 vs. time 3) and D2 (time 2 vs. time 3) to test whether MeToo had an immediate impact on attitudes, and D3 (time 3 vs. time 4) to test for long-term effects. Gender was entered as a between-subjects categorical variable, and each of our moderators were entered as continuous between-subjects variables. Both gender and the other moderators were centered to ensure the interpretability of main effects and two-way interactions. We examined the distribution of our primary dependent variable, dismissal of sexual assault at each time point, and found that it was highly skewed at time 3 and time 4 (skewness > 0.8). Therefore we log-transformed¹ this variable before proceeding with our main analyses, however we present graphs with the untransformed variable for ease of interpretation.

3.2. Effect of #MeToo on dismissal of sexual assault: reactions of men and women

The zero-order correlations among study variables are reported in SM. We first examined changes across time points in sexual assault dismissal among both men and women, using a mixed-level model with time and gender as predictors.² There were significant main effects of time and gender (see Table 1). Among both men and women, there was a significant decrease in dismissal of sexual assault following the MeToo movement (see Fig. 1): dismissal of sexual assault at Time 3 was significantly lower than both Time 1 and Time 2. In addition, there was no change from Time 3 to Time 4 indicating that this effect persisted for 6 months.³ Further, while there was a main effect of gender (indicating that women are lower on sexual assault dismissal than men), there were no interactions between time and gender indicating that MeToo had similar levels of impact on both men and women.

¹ We used a log base 10 transformation. In addition, as the scale of this variable included 0 we added 10 (chosen because it was the base of the log) to all values before log transforming.

² At the end of Time 1 survey we asked participants who they voted for, which we categorized to Donald Trump or not. In order to make sure that the observed effects were not shaped by participants' support for Trump, data analyses were also performed while controlling for voting and results do not change significantly.

³ While this model does not allow us to directly compare time 4 with time 1 or time 2, we also tested a model with time 4 as the reference category and found that these results are also significant.

Table 1

Results of mixed model examining change in dismissal of sexual assault over time by gender.

	<i>b</i>	95% CI	SE	<i>t</i>	<i>p</i>
Intercept	1.43	[1.38, 1.48]	0.02	60.10	< 0.001
Time D1	0.08	[0.04, 0.12]	0.02	4.19	< 0.001
Time D2	0.09	[0.04, 0.13]	0.02	4.06	< 0.001
Time D3	0.004	[−0.03, 0.04]	0.02	0.22	0.82
Gender	0.23	[0.14, 0.33]	0.05	4.86	< 0.001
Time D1 × Gender	0.01	[−0.06, 0.09]	0.04	0.35	0.73
Time D2 × Gender	0.0002	[−0.08, 0.08]	0.04	0.004	0.99
Time D3 × Gender	−0.004	[−0.08, 0.07]	0.04	−0.11	0.91

Note. Gender was coded as $-0.55 = \text{man}$, $0.45 = \text{women}$ (mean-centered for the interpretability of other main effects and 2 way interactions). D1 is the contrast between Time 1 (baseline) vs. Time 3 (immediately following MeToo). D2 contrasts Time 2 (Women's March) vs. Time 3. D3 contrasts Time 3 vs. Time 4 (6-months following MeToo).

3.3. Effect of #MeToo as a factor of individual differences

We then conducted moderation analyses to determine if effectiveness of #MeToo depended on any relevant individual differences. Given the centering of the moderators and of gender, these analyses enabled us to detect any 2-way interaction considering the possible combinations of time, gender and moderator and the relevant 3-way interaction. There were no significant interactions with feminist identification (for details see SM). Regarding gender-identification, opposed to our prediction, the three-way interaction between gender and gender-identification and time variables was not significant ($p's > 0.46$), but there was a significant 2-way interaction between D1 and gender-identification ($b = -0.05$, $CI = [-0.09, -0.02]$ $SE = 0.02$, $t = -2.77$, $p = 0.005$). This interaction indicated that people high on gender-identification did not change in dismissal of sexual assault from time 1 to time 3 ($b = 0.02$, $CI = [-0.04, 0.08]$ $SE = 0.03$, $t = 0.71$, $p = 0.48$, probably due to a floor effect indicated by low levels of dismissal of sexual assault at time 1), while people with low gender-identification changed over time to become less dismissive of assault ($b = 0.13$, $CI = [0.08, 0.19]$ $SE = 0.03$, $t = 4.65$, $p < 0.001$).

Notably, besides this interaction, there was a significant three-way interaction between social dominance orientation (SDO), gender, and the dummy variables reflecting the pre/post effect of #MeToo (D1 and D2; see Table 2). Based on simple slopes analysis, there was a significant effect (both in relation to Time 1 and Time 2) on men who were low or moderate-SDO, decreasing their dismissal of sexual assault following #MeToo (see Fig. 2 and Table 3). However for men with high-SDO, there was no impact of #MeToo. On the other hand, for women, #MeToo had an impact (both in relation to Time 1 and Time 2) on those with high or moderate-SDO, and no impact on those with low-SDO. As expected, effects were not significant for D3, meaning there was no change in attitudes between Time 3 and Time 4.

4. Discussion

#MeToo was a viral global social media movement, which aimed to raise awareness to the prevalence of sexual assault. Some argue it was successful in achieving its goals, meanwhile others raised criticism to its harmful societal effects, like increasing false complaints and pitting the sexes against each other (see Kunst et al., 2019). In the present research, we investigated how general public's views of sexual assault changed following #MeToo. We had four time waves of measurement and found that at peak of #MeToo, compared to baseline waves, dismissal of sexual assault was lower. Importantly, this reduction persisted after 6 months, suggesting that beyond immediate change, there was likely a normative (Tankard & Paluck, 2016) or personally internalized (Klonis et al., 2005) change in attitudes. Additionally, it seems that it was specifically #MeToo, and not just any gender movement that exert

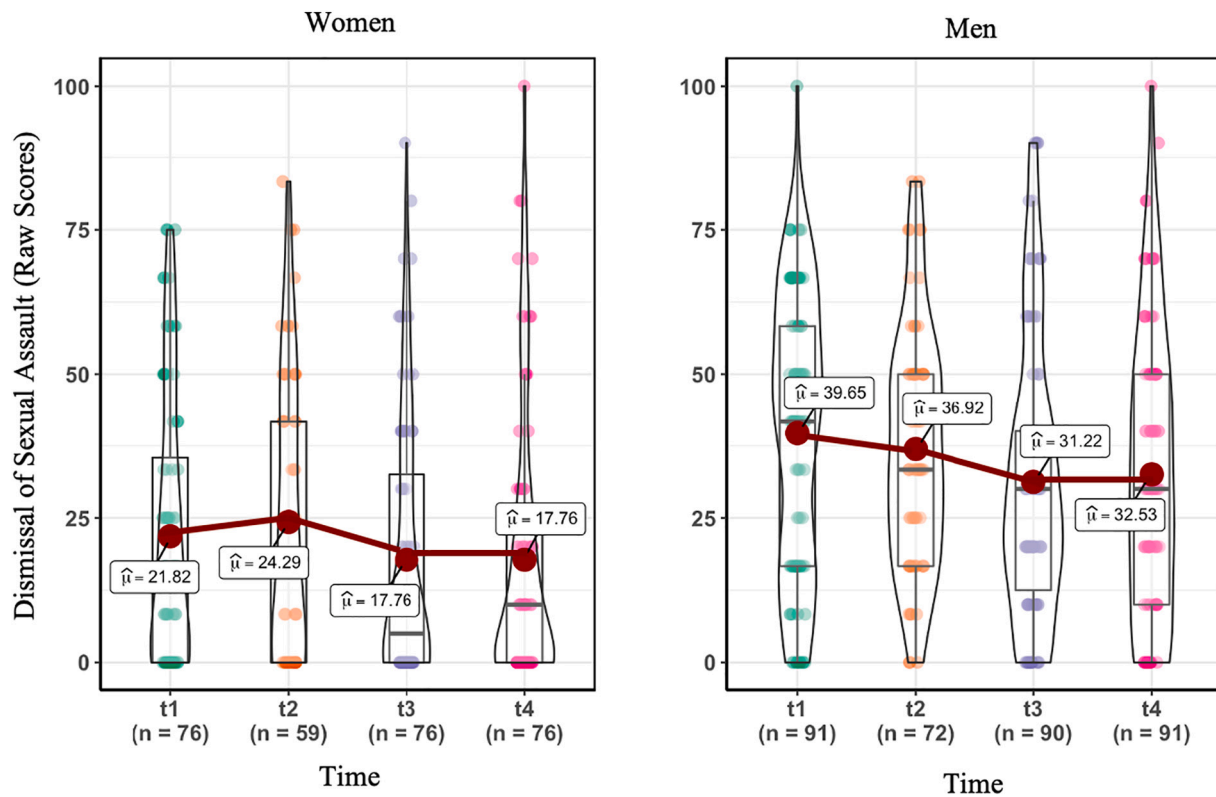


Fig. 1. Dismissal of sexual assault by gender across time waves (e.g., t1 = time 1).

Table 2

Results of mixed model examining change in dismissal of sexual assault over time by gender and social dominance orientation (SDO).

	<i>b</i>	95% CI	SE	<i>t</i>	<i>p</i>
Intercept	1.44	[1.40, 1.48]	0.02	62.30	< 0.001
Time D1	0.10	[0.06, 0.14]	0.02	4.72	< 0.001
Time D2	0.10	[0.06, 0.14]	0.02	4.47	< 0.001
Time D3	0.0009	[−0.04, 0.04]	0.04	0.05	0.96
Gender	0.16	[0.07, 0.25]	0.02	3.47	< 0.001
SDO	0.12	[0.07, 0.16]	0.04	5.00	< 0.001
Time D1 × Gender	0.008	[−0.07, 0.09]	0.04	0.19	0.85
Time D2 × Gender	−0.005	[−0.09, 0.08]	0.04	−0.12	0.91
Time D3 × Gender	0.002	[−0.07, 0.08]	0.04	0.05	0.96
Time D1 × SDO	−0.0009	[−0.04, 0.04]	0.02	−0.04	0.97
Time D2 × SDO	0.008	[−0.03, 0.05]	0.02	0.36	0.72
Time D3 × SDO	−0.008	[−0.05, 0.03]	0.02	−0.42	0.67
Gender × SDO	−0.06	[−0.15, 0.03]	0.04	−1.29	0.20
Time D1 × Gender × SDO	−0.10	[−0.18, −0.02]	0.04	−2.36	0.02
Time D2 × Gender × SDO	−0.10	[−0.18, −0.01]	0.04	−2.20	0.03
Time D3 × Gender × SDO	0.02	[−0.06, 0.11]	0.04	0.56	0.58

Note. Same indicators as for Table 1.

such influence, because sexual assault views were not changed following the Women's March, which we also tested.

Importantly, we tested individual differences that could mitigate or amplify the impact of #MeToo, and social dominance orientation and gender moderated its impact. We predicted that those with low levels of SDO (both men and women) would be affected more positively by #MeToo than those high on SDO. However, we found a more complex relationship, whereby men low on SDO and women high on SDO became less dismissive of sexual assault following #MeToo. Men with low-SDO (whose initial assault views actually matched women with high SDO) were affected likely because they were more open and receptive to the campaign's message. Meanwhile men with high-SDO were not significantly impacted by #MeToo. This could be, because in general, SDO is linked to endorsement of traditional gender roles and sexism since it promotes a belief that certain groups should be superior

to others, such as men ought to dominate over women (Pratto et al., 1994). Accordingly, SDO was found to correlate with endorsement of sexual assault (e.g., Kelly et al., 2015). In fact, when male dominance is threatened, men are more likely to endorse sexual dominance (such as assault) over women (Maass et al., 2003) perhaps in order to correct power inequalities and “put women back in their place” (Pratto & Walker, 2004). Endorsing these beliefs likely guarded against attitude change following #MeToo for men with high-SDO.

For women with high-SDO, regardless of their tendency to support social dominance, the campaign likely raised awareness to the prevalence of sexual assault, and they could empathize with victims from their own (gender) group. Supporting this possibility, prior literature suggests that high-SDO women may endorse benevolent sexism not because they have little sympathy for their own group's interest but because they are aware that men dominate women, and they seek

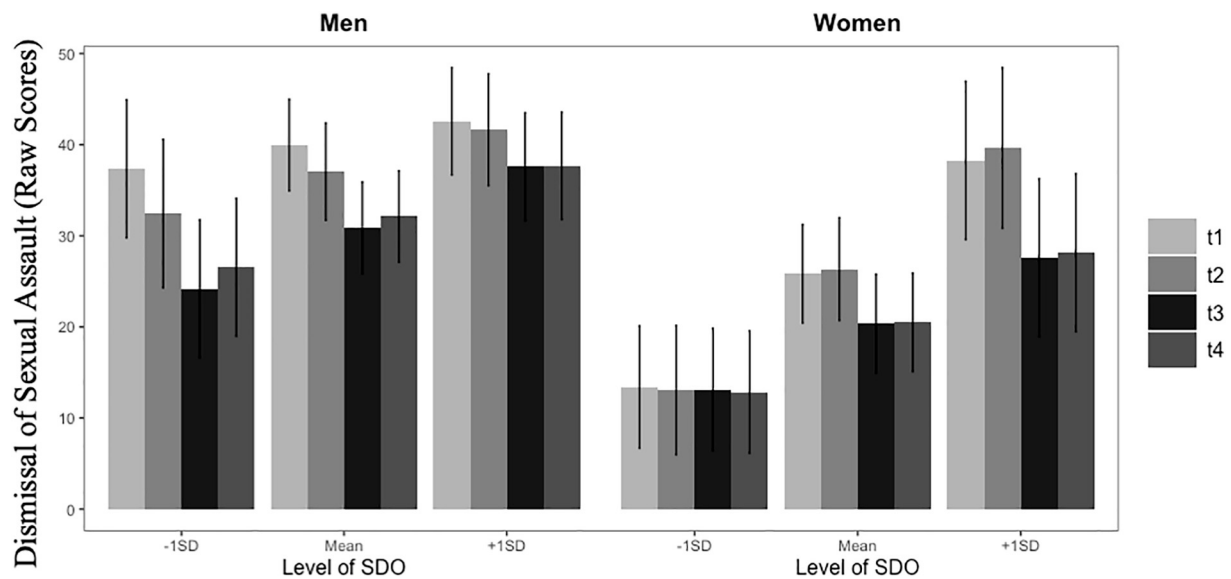


Fig. 2. Dismissal of sexual assault by gender and social dominance orientation (SDO) across Time (e.g., t1 = Time 1). Bars reflect 95% confidence intervals.

Table 3

Simple slopes analysis of the effect of time according to gender and social dominance orientation (SDO).

	Time D1: change between Times 1 and 3				
	b	95% CI	SE	t	p
Men low on SDO (−1 SD)	0.15	[0.06, 0.23]	0.04	3.50	< 0.001
Men average on SDO (Mean)	0.10	[0.05, 0.15]	0.03	3.66	< 0.00
Men high on SDO (+1 SD)	0.05	[−0.01, 0.12]	0.03	1.62	0.11
Women low on SDO (−1 SD)	0.04	[−0.03, 0.11]	0.04	1.06	0.29
Women average on SDO (Mean)	0.09	[0.03, 0.15]	0.03	2.99	< 0.001
Women high on SDO (+1 SD)	0.14	[0.04, 0.25]	0.05	2.76	< 0.001

	Time D2: change between Times 2 and 3				
	b	95% CI	SE	t	p
Men Low on SDO (−1 SD)	0.13	[0.04, 0.22]	0.05	2.86	< 0.001
Men Average on SDO (Mean)	0.09	[0.04, 0.15]	0.03	3.21	< 0.001
Men High on SDO (+1 SD)	0.06	[−0.01, 0.13]	0.03	1.69	0.09
Women Low on SDO (−1 SD)	0.04	[−0.04, 0.12]	0.04	1.00	0.32
Women Average on SDO (Mean)	0.10	[0.04, 0.16]	0.03	3.08	< 0.001
Women High on SDO (+1 SD)	0.16	[0.05, 0.27]	0.05	3.01	< 0.001

Note. Same indicators as for Table 1.

protection (Radke, Hornsey, Sibley, & Barlow, 2018). Women with low-SDO were not significantly impacted, perhaps because they were to begin with low on dismissal.

While the occurrence of the #MeToo campaign was associated with a decrease in dismissal of sexual assault for men and women, we found that gender-identification moderated this effect. Regardless of gender, those high on gender-identification did not change, but people with low-identification became less dismissive of assault. In general, low-identifying men are more invested in women's issues than high-identifying men, and this pattern tend to be the opposite for women (Iyer & Ryan, 2009). Similar to the findings with SDO, we assume that low-identifying men were more open to change their views, and low-identifying women, similarly to the pattern observed for high-SDO women, moved away from their initial relatively higher levels of dismissal – as opposed to high-identifying women who were already low. These explanations may drive the effect, however gender-identification is not considered alone but defined by gender, therefore it is difficult to

interpret this relationship.

Other individual and personal characteristics that we tested, namely, feminist-identification, personal experience of sexual assault and parental status (aka. having daughters), did not reveal any influence, although these were previously found associated with views about sexual assault (see Kunst et al., 2019).

Unlike in prior work that demonstrated how exposure to Women's March (Saguy & Szekeres, 2018) and to a campus racial protest (Selvanathan & Lickel, 2019) led to backlash effect among some, we did not find this negative trend. This is surprising given vocal criticism that surrounded the #MeToo (see Kunst et al., 2019). However, even those who criticized the movement, likely still did not become defensive about their views on sexual assault, so it did not trigger backlash in this regard.

A considerable limitation of our study is that we are not able to establish with certainty that #MeToo influenced sexual assault attitudes. Instead, these findings may be driven by history effect. However, gender attitudes that we additionally tested (modern and benevolent sexism, gender system justification, perceptions of female leaders; all reported in SM) did not significantly change overtime, and we are unaware of any (“historic”) major event that could conveniently explain our findings on changes in sexual assault views and the moderation effect with SDO.

Another limitation of the study is the sample size at Time 4 as we recruited around 500 participants at Time 1 but there was a 68% attrition rate, which rate is normal on mTurk and we could not control it. Due to this attrition, we conducted dropout analyses and found that participants higher on dismissal of sexual assault, and on SDO were more likely to dropout. However, because all study analyses were within-subjects we can still be confident about the change that occurred within our sample. Nevertheless, this difference could indicate that those who dropped out may have been less likely to change. That being said we conducted additional analyses (SM) with Time 1 levels of these variables as moderators, and found that there were still effects of #MeToo at the mean level of these variables in the original sample, which gives us some confidence that had the whole sample remained, we would have still observed effects of #MeToo.

In the same time, the main strength of our study is that we were able to track these views overtime, before the #MeToo, during and after. The present study context also enables us to establish external validity of our findings, to generalize to real-world events. Additionally, we contribute to the scarce literature on the effects of collective action in

changing public opinion. Besides theoretical advances, understanding these processes also has applied implications. Activists and organizations, who struggle with both raising awareness to their cause and remaining credible to the general public (Louis, 2009), can benefit from knowledge about how social change efforts can be effective and change (different) people's attitudes. Our finding that high-SDO women but not men, and low-SDO men but not women can be impacted by such campaigns can inform social change actors in how to build targeted messages and campaigns.

CRedit authorship contribution statement

Hanna Szekeres: Conceptualization, Investigation, Methodology, Project administration, Validation, Writing - original draft, Writing - review & editing. **Eric Shuman:** Formal analysis, Writing - original draft, Writing - review & editing. **Tamar Saguy:** Supervision.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.paid.2020.110203>.

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